

Asian Institute of Technology
School of Engineering and Technology

AT76.31 Research Methodology in Geoinformatics 1 (1-0) Semester: January

Course Objective: The objective of this course is to prepare the student for their research at AIT in Geoinformatics and to develop statistical skills. Students will be introduced with research methods and steps in research design relevant to Geoinformatics research. The course will cover scientific reading and writing, including proposal and thesis writing in AIT. Additionally, the objective is also to introduce statistical methods for analyzing spatial and non-spatial data.

Learning Outcomes:

The students on the completion of this course would be able to:

1. Efficiently read and analyze any scientific document
2. Identify effective ways of writing scientific reports, including journal articles, thesis, research proposals etc.
3. Learn how to present research in an effective way in front of a crowd and deliver the message commendably
4. Describe and apply basic statistical analysis, types and applications
5. Distinguish several statistical tools in remote sensing and GIS analysis and their applicability in practical applications

Prerequisite: None

Course Outline:

- I. Literature
 1. Critical evaluation of scientific papers
 2. Integrating article themes
 3. Reporting the abstract and conclusion
 4. Evaluation of papers

- II. Proposal, Thesis/Dissertation and Journal article
 1. Asking questions, contributing and critical thinking
 2. Parts of a proposal/thesis/ Dissertation/ Journal article
 3. Effective writing styles
 4. Centering on one track

- III. Research presentations
 1. Components of a research presentation
 2. Ways to make good presentation
 3. Preparing for thesis proposal/defense

School Recommendation: _____

ADRC Approval: 10 April, 2019

Academic Senate Approval: 24 April, 2019

- IV. Introduction to statistics
 1. Statistical terms and definitions
 2. Types of statistical analysis
 3. Probability distribution functions
 4. Hypotheses testing
 5. Central limit theorem
 6. Normality testing

- V. Descriptive statistics
 1. Moments of normal distribution
 2. Quantitative data representation
 3. Graphical data representation
 4. Z-score

- VI. Inferential statistics
 1. T-tests
 2. ANOVA
 3. Chi-square test of Independence
 4. Correlation analysis
 5. Regression Analysis

Laboratory Sessions:

Laboratory sessions on each test will be conducted in SPSS and interpretations will be made live.

Learning resources:

Text Books: No designated textbook, but lecture notes and handouts will be provided.

Reference Books:

Rogerson, Peter A.:

Statistical methods for Geography (Fourth Edition). SAGE publications, USA, 2015

Alfred Stein, Freek Van der Meer, Ben Gorte:

Spatial Statistics for Remote Sensing, Springer, Dordrecht ., 2002

Bhatta, Basudeb:

Research Methods in Remote Sensing, Springer, Netherlands, 2013

Journals and Magazines:

School Recommendation: _____ ADRC Approval: _____

Academic Senate Approval: _____

Remote sensing of environment, Elsevier
Environmental monitoring and assessment, Springer
Remote sensing, MDPI
Journal of geographic information systems, Springer
International Journal of Applied Earth Observation and Geoinformation,
Elsevier

Others:

AIT Library resources <http://languages.ait.ac.th/guide-to-research-writing/>

Teaching and Learning Methods:

1. **Lectures and class discussion:** Students receive the lecture materials and reference materials and taught using power points and extensive discussion and explanation on white board.
2. **Laboratory sessions:** *Data Analysis* is done on real field data from field in the class-exercises and support is provided to students to learn.
3. **Assignments:** Assignments are given both on scientific reading and data analysis. Students are encouraged to analyse scientific literature and feedback is provided. Appropriate statistical analysis is encouraged to conduct for particular problem in software and interpret them in written. Support is provided at all aspects.

Time Distribution and Study Load:

Lectures: 15 Hrs

Self-study + Assignments: 45 Hrs

Evaluation Scheme:

Assignments: 60%

Final exam (closed book): 40%

A student would be awarded "A" if he/she perform excellent in final semester examination as well as shows ability to produce an excellent research overview report and solve statistical exercises; "B+" would be awarded if a student shows good understanding of the concepts through examination yet produces excellent assignments or vice versa; a "B" would be provided if he/she perform good in examination and good research overview report and other statistical assignment; "C" would be given if the student meets below expectations in both examination and assignments; A "D" would be given if a student does not meet basis expectations in understanding the topics and issues presented in course.

Instructor(s): Affiliated Faculty

School Recommendation: _____ ADRC Approval: _____

Academic Senate Approval: _____